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THE AUDITORY MEMORY OF CHILDREN FROM DIFFERENT SOCIO-ECONOMIC BACKGROUNDS.

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THIS SPEECH PRESENTS THE FINDINGS OF A STUDY OF THE VERBAL RECALL ABILITY OF 102 HIGH AND LOW SOCIOECONOMIC STATUS (SES) CHILDREN IN THE PRIMARY GRADES. THE HIGH SES SUBJECTS ATTENDED A UNIVERSITY SCHOOL IN AN UPPER-MIDDLE-CLASS SUBURB, AND AT LEAST ONE OF THEIR PARENTS HAD ATTENDED COLLEGE. THE LOW SES SUBJECTS WERE IN A COMPLETELY NEGRO SUBURBAN PUBLIC SCHOOL AND THE EDUCATIONAL LEVEL OF THEIR FATHERS WAS ESTIMATED TO BE NO MORE THAN HIGH SCHOOL. THE SUBJECTS WERE ASKED TO PERFORM TEST TASKS WHICH MEASURED AUDITORY MEMORY AT FOUR LEVELS OF VERBAL STRUCTURE--NONSENSE SYLLABLES, NOUNS, NONSENSE SENTENCES, AND MEANINGFUL SENTENCES. RESPONSES WERE RECORDED ON TAPE AND SCORED AS AN IMMEDIATE MEMORY SPAN TASK. ANALYSIS OF THE DATA SHOWED THAT AUDITORY MEMORY IS GREATER AS LANGUAGE SKILL SUPPLEMENTS MEMORY CAPACITY, AND THAT OLDER CHILDREN REMEMBER MORE UNITS THAN DO YOUNGER ONES. IT WAS ALSO FOUND THAT THERE WAS NO SIGNIFICANT INTERACTION BETWEEN TASK LEVEL AND GRADE LEVEL, NOR BETWEEN SES AND TASK LEVEL. FINALLY, NO CUMULATIVE DEFICIT WAS FOUND WHEN THE INTERACTION OF AGE, TASK LEVEL, AND SES WAS ANALYZED. IT IS TENTATIVELY INFERRED THAT YOUNGSTERS FROM DIFFERENT SES BACKGROUNDS "TEND TO USE SIMILAR STRATEGIES AT EACH OF THE LEVELS FOR PROCESSING INFORMATION." THIS PAPER WAS PRESENTED AT THE AMERICAN EDUCATIONAL RESEARCH ASSOCIATION MEETING (FEBRUARY 9, 1968). (NH)

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THE AUDITORY MEMORY OF CHILDREN FROM DIFFERENT SOCIO-ECONOMIC BACKGROUNDS:

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Introduction

Several years ago my colleagues and I compared the performance of children from different socio-economic backgrounds on a series of verbal tasks (Barritt, Semmel, and Weener, 1966; 1967a). We were not surprised to find differences between high and low SES groups on scales requiring vocabulary and syntactic skills. We were however, struck by the lack of significant difference between groups on an auditory memory scale. Since auditory memory is part of many operational definitions of intelligence it seemed surprising and paradoxical that this scale should not reinforce the general image of deficit for the low socio-economic (LSES) children.

Subsequently a second study was done comparing the auditory memory capacity of these same children using the set of stimulus materials which you find in the appendix of your handout (Barritt, Semmel, and Weener, 1967b). The results of this study again indicated no overall differences in auditory memory capacity for the two groups. It was decided to replicate this latter study using the same stimulus materials but drawing new samples of children from extremely different backgrounds. It is that study which I am reporting here.

PURPOSE: It was the purpose of the present study to compare the verbal recall ability of children from high and low socio-economic backgrounds using materials which call for different levels of language skill.

Method

Sample Seventeen children in the kindergarten, first, and second grades from two disparate socio-economic backgrounds were subjects in this study. The total number of subjects was 102.

Those children, here called the high socio-economic status group (HSES), attended the university school in an upper-middle class suburban community where the median income is over $7,000. At least one of the parents of all of these children had attended college. The average number of school years completed beyond high school for the fathers of children in this group was over six years (6.31 years).

The lower socio-economic status (LSES) children in the sample attended a public school in a suburban community close to a large city. The median income in this community of primarily blue collar workers is approximately $5,000. The public school that these children attended was made up of entirely negro children due to the housing patterns in the community. No record of either parent's educational level was available for this group. However, it was possible to extrapolate from the occupation of each father what the necessary educational level to perform that work would be. Such an analysis indicates that none of the fathers were doing work which would require more than a high school diploma.

All of the kindergarten, first, and second grade children at the university school (HSES) were included in this study. An equal number of kindergarten, first, and second graders were randomly selected from the public school in the LSES community.

Procedure Each child was seen individually by a white female who conducted all of the experimental sessions in a small private room.

Instructions were read after the experimenter was confident that the child was at ease. The instructions included several test tasks to insure the child's understanding of the procedure. Experimental lists are presented in the appendix.

As I mentioned earlier this instrument was used in a previous study (Barritt, Semmel, and Weener, 1967). The tasks were designed to measure auditory memory at four levels of verbal structure. Items in the first task level consist of CVC trigrams selected at random from the Underwood and Shulz lists (1960) with meaningfulness ratings in the 30-70 range. The second task level contains nouns selected randomly without replacement from the 500 most frequent words in the original Thorndike count, excluding common homonyms (Thorndike and Lorge, 1944).

The third and fourth task levels contain sentences with respective items at each level having the same grammatical structure. Level 3 are meaningless (anomalous) and Level 4 are meaningful sentences. The anomalous (level 3) sentences were generated by stratifying the word pool from level 4 on form class and then selecting words randomly to fit the appropriate frames at level 3.

The entire auditory memory test was recorded and presented to the subjects on a MagMatic Tape Repeater. The words in Levels 1 and 2 were read as a list at the rate of 1 unit per second. The sentences of Levels 3 and 4 were read with normal sentence inflection at the rate of 3 words per second. Lists were presented in four different orders based on a balanced 4 x 4 Latin square. Each subject was asked to recall the words in proper order. Only one trial was given for each item and the ceiling was

established at two incorrect items in each list. The subject's responses were recorded and scored later as an immediate memory span task. A subject's score for each level was the number of words in the last item correctly recalled.

Hypotheses

It was predicted that:

Hypothesis 1

Children would recall more information as lists permit the use of semantic and/or syntactic language habits. Thus it should be possible for children to recall more units when the material is presented in sentence form than when there are no contextual constraints between items in the list.

Hypothesis 2

Older children would recall more units of information than younger children.

Hypothesis 3

The disparity between older and younger children would become greater as tasks permit the use of language skills to aid in recall.

Thus older and younger children should be more alike in recall ability for nonsense words than for meaningful sentences.

Hypothesis 4

Children from different socio-economic backgrounds would be increasingly dissimilar in auditory memory capacity as previously learned language habits could be used to aid in recall. Thus children from the HSES group

would remember more of the sentence material than their LSES counterparts, but that these groups would be more similar in recall for unstructured material.

Hypothesis 5

The predicted interaction between task levels and SES backgrounds will be greater for older than younger children. In other words a cumulative deficit is predicted between SES groups with increases in age. This deficit should manifest itself most clearly in older children at levels 3 and 4 where language habits can be most helpful.

Results

The raw score means and standard deviations for each of the groups at the four task levels are presented in table one. It should be noted that the standard deviations are markedly different across the four task levels. The largest variance is 36 times the smallest. Therefore, a log transformation was performed upon the raw scores to reduce the heterogeneity of variance.

A three way ANOVA was then performed upon the transformed data with the 2 levels of socio-economic status, the three grades and four task levels serving as factors (Edwards p. 224). All of the main effects were significant while none of the interactions were significant. The F ratios were 21.89 $p < .01$ for socio-economic status, 4.08 $p < .05$ for grade level, and 371.20 $p < .01$ for task levels.

Confirmation of hypothesis one that children remember more units as language habits can be utilized was suggested by the whopping F ratio for task levels. Examination of the means at each task level reveals that striking

increases are achieved from one level to the next as language skill supplements memory capacity to increase the number of units recalled.

The second hypothesis was confirmed by the significant main effect observed for grade levels. Figure 1 displays the means for this analysis at each of the task levels. Older children remember more units than younger children.

The third prediction that older children will do better, relatively speaking, at task levels 3 and 4 when compared to 1 and 2 calls for the observation of an interaction between task levels and grades. This prediction is not confirmed even though the graph of the trends in Figure 1 seems to support the prediction.

Hypothesis 4 requires that an interaction between socio-economic status and task levels be observed. This hypothesis was not confirmed. There is no significant difference in the slope of the trends across task levels for LSES and HSES children. Figure 2 is a graph of the trends for this analysis. The significant main effect for socio-economic status coupled with the lack of a significant interaction with task levels suggests that the differences between LSES and HSES children in memory capacity remains relatively constant as the nature of the material to be recalled changes.

The absence of a significant three way interaction between SES, grades, and task levels indicates that the trends of increase from levels 1 to 4 is not different for the three grade groups from different SES backgrounds. Hypothesis 5 must be rejected.

Figure 3, 4, and 5 are plots of the two SES groups at each of the four task levels. Examination of the figures suggests that even if the 3 way interaction had reached a level of statistical significance it would have been due to the greater deficits at levels 3 and 4 for younger low SES children rather than older. This is the opposite trend from that which was predicted. Like findings have been reported in studies of similar groups but using PA learning tasks (Semler and Iscoe 1963; Rohwrer, 1967).

The major focus of the present study rests with the prediction that the auditory memory of different socio-economic groups would be affected differently by the levels of material in this study. This prediction cannot be supported by the data.

A tentative inference from this might be that children from different SES backgrounds tend to use similar strategies at each of the levels for processing information.

This latter statement, in spite of the lack of interactions seems to be a more accurate generalization when applied to 7 year olds then to 5 and 6 year olds.

References

Barritt, L.S., Semmel, M.I., & Weener, P.D., The changes in psycholinguistic functioning of children after one year in an integrated school, Studies in language and language behavior, V, September 1, 1967, Center for Research on Language and Language Behavior, University of Michigan, Contract OEC-3-6-061784-0508, U.S. Office of Education.

Barritt, L.S., Semmel, M.I., & Weener, P.D., The immediate memory span of children from advantaged and disadvantaged backgrounds, Studies in language and language behavior, V, September 1, 1967, Center for Research on Language and Language Behavior, University of Michigan, Contract OEC-3-6-061784-0508, U.S. Office of Education.

Barritt, L.S., Semmel, M.I., & Weener, P.D., A comparison of the psycholinguistic functioning of "educationally-deprived" and "educationally-advantaged" children, Studies in language and language behavior, II, February 1, 1966, Center for Research on Language and Language Behavior, University of Michigan, Contract OEC-3-6-061784-0508, U.S. Office of Education.

Edwards, A.L., Experimental design in psychological research, New York: Rinehart & Co., 1960.

Rohwer, W.D., Social class differences in the role of linguistic structures in paired-associate learning. Final report, U.S. Department of Health, Education, & Welfare, 1967.

Semler, I.J., & Iscoe, I. Comparative and developmental study of the learning abilities of Negro and white children under four conditions. Journal of Educational Psychology, 1963, 54, 38-44.

Thorndike, E.L., & Lorge, I. The teacher's word book of 30,000 words. New York: Columbia University Press, 1944.

Table 1

Raw Score Means and Standard Deviations at Four Task Levels for High and Low Socio-economic Groups at Three Grade Levels

		L-1		L-2		L-3		L-4	
		$\bar{X}$	S	$\bar{X}$	S	$\bar{X}$	S	$\bar{X}$	S
High SES	Grade K n=17	2.82	.71	3.88	.58	8.59	1.50	10.12	2.61
	Grade 1 n=17	2.29	.71	3.82	.58	7.77	1.50	10.94	2.61
	Grade 2 n=17	3.06	.80	4.35	.76	9.06	1.55	11.77	1.93
Low SES	Grade K n=17	1.82	1.15	3.18	.98	5.88	2.78	7.88	2.42
	Grade 1 n=17	1.77	1.31	3.53	.70	6.94	2.75	8.35	3.51
	Grade 2 n=17	2.06	1.43	3.47	.61	7.65	2.59	11.18	1.20

L-1 Level one - nonsense words

L-2 Level two - common nouns

L-3 Level three - anomalous sentences

L-4 Level four - meaningful sentences

Figure 1

Average Raw Scores for Kindergarten, First, and Second Grade Children at 4 task levels

	L-1	L-2	L-3	L-4
Kindergarten	2.3235	3.5294	7.2353	9.0000
First Grade	2.0294	3.6764	7.3529	9.6471
Second Grade	2.5588	3.9117	8.3529	11.4706

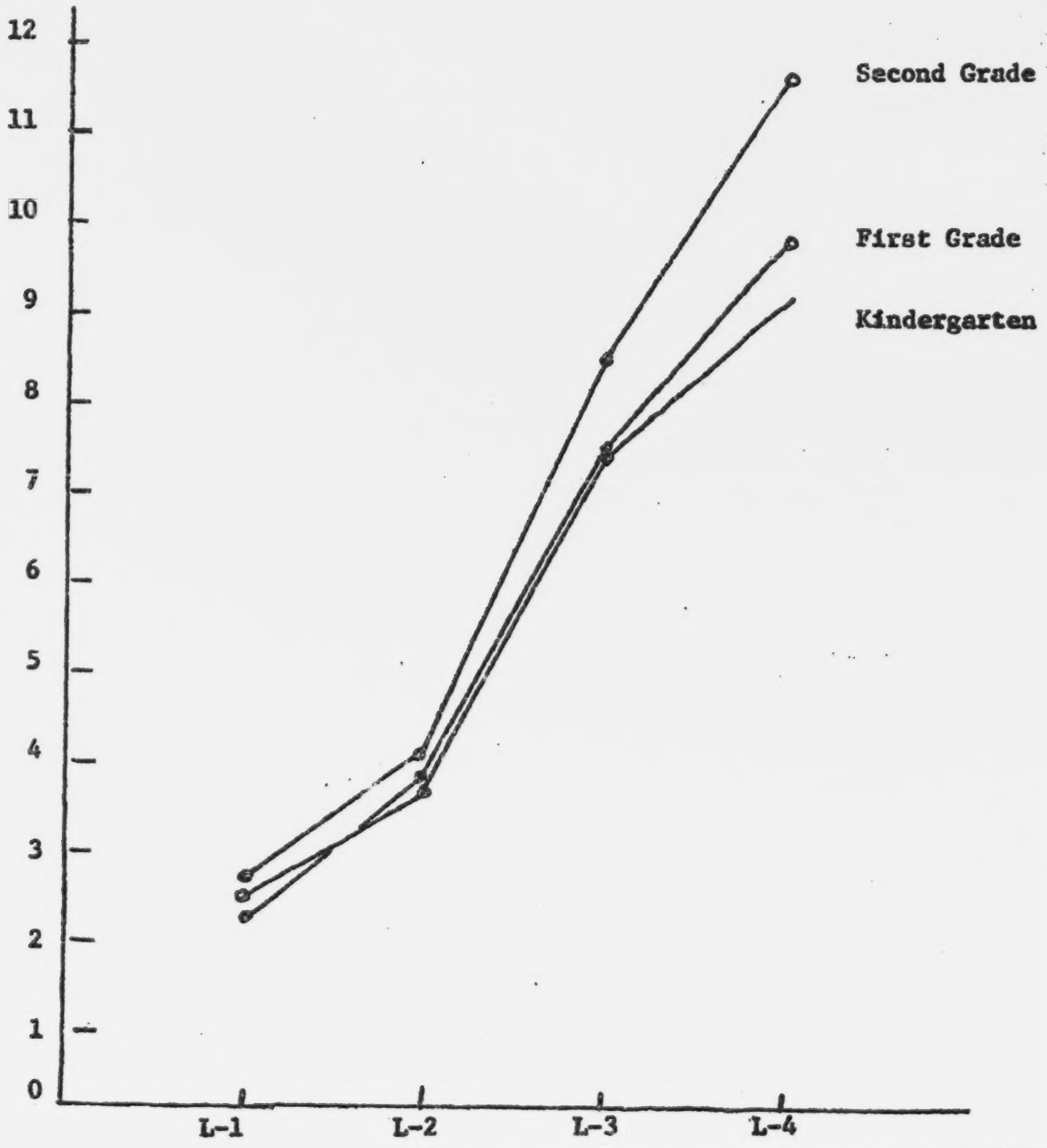


Figure 2

Average Raw Scores for High and Low Socio-Economic Status groups at 4 task levels for grades K, 1 and 2 combined

	L-1	L-2	L-3	L-4
High SES	2.7255	4.0196	8.4706	10.9412
Low SES	1.8823	3.3922	6.8236	9.1373

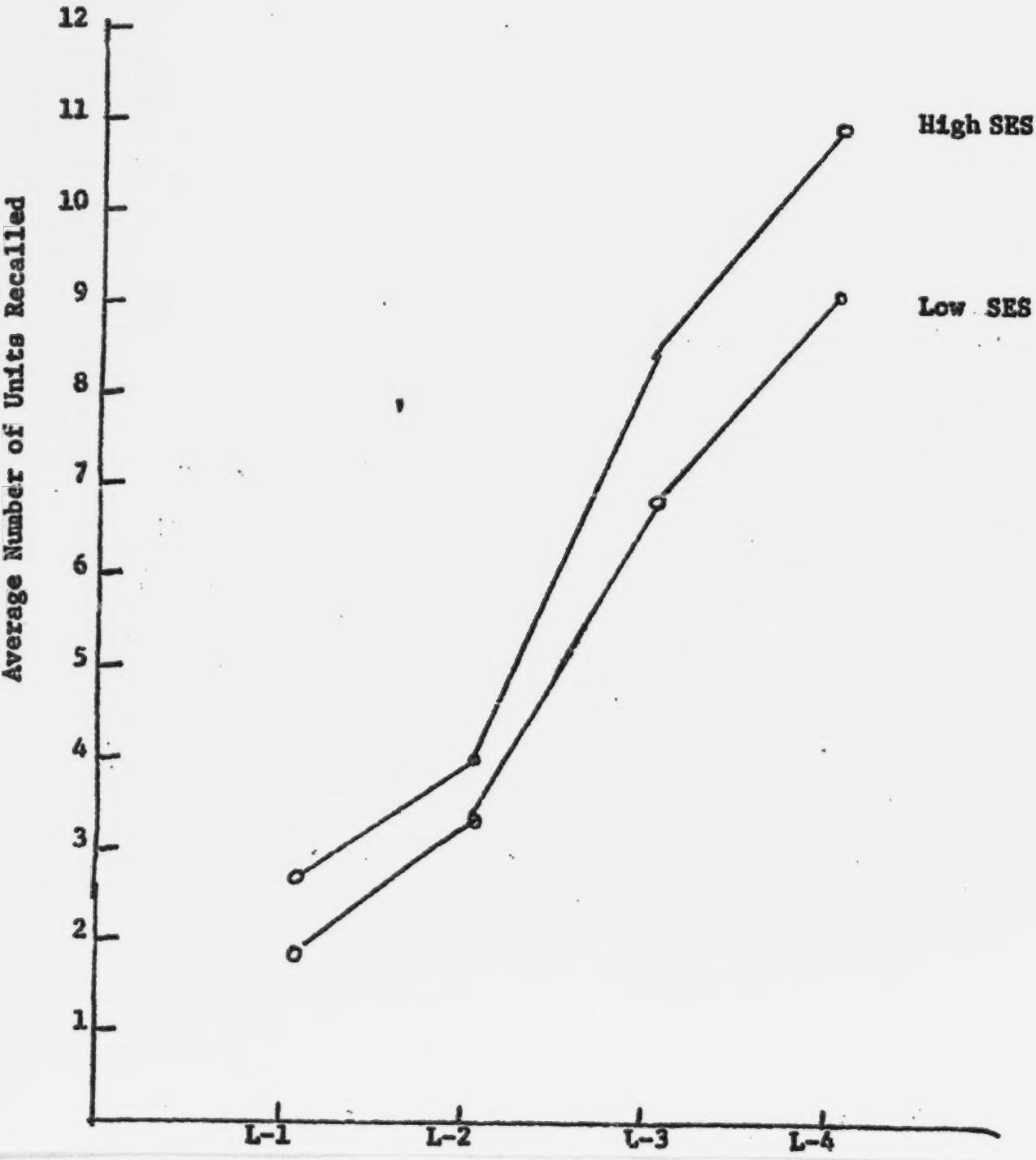


Figure 3

Average Raw Scores for Kindergarten Children from High and Low SES groups

	L-1	L-2	L-3	L-4
High SES	2.8235	3.8824	8.5882	10.1176
Low SES	1.8235	3.1765	5.8824	7.8824

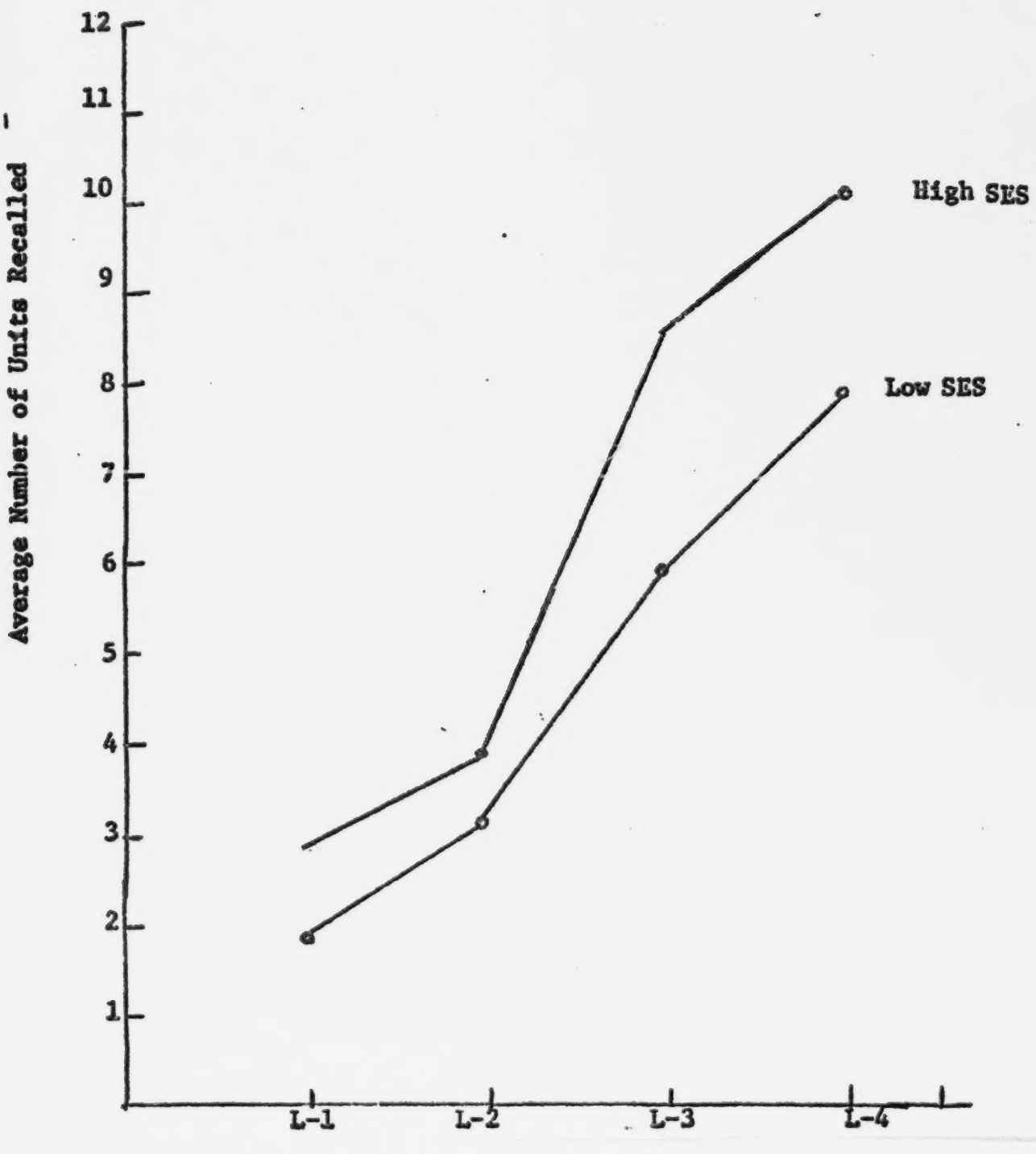


Figure 4

Average Raw Scores for First Grade Children from High and Low SES groups

	L-1	L-2	L-3	L-4
High SES	2.2941	3.8235	7.7647	10.9412
Low SES	1.7647	3.5294	6.9412	8.3529

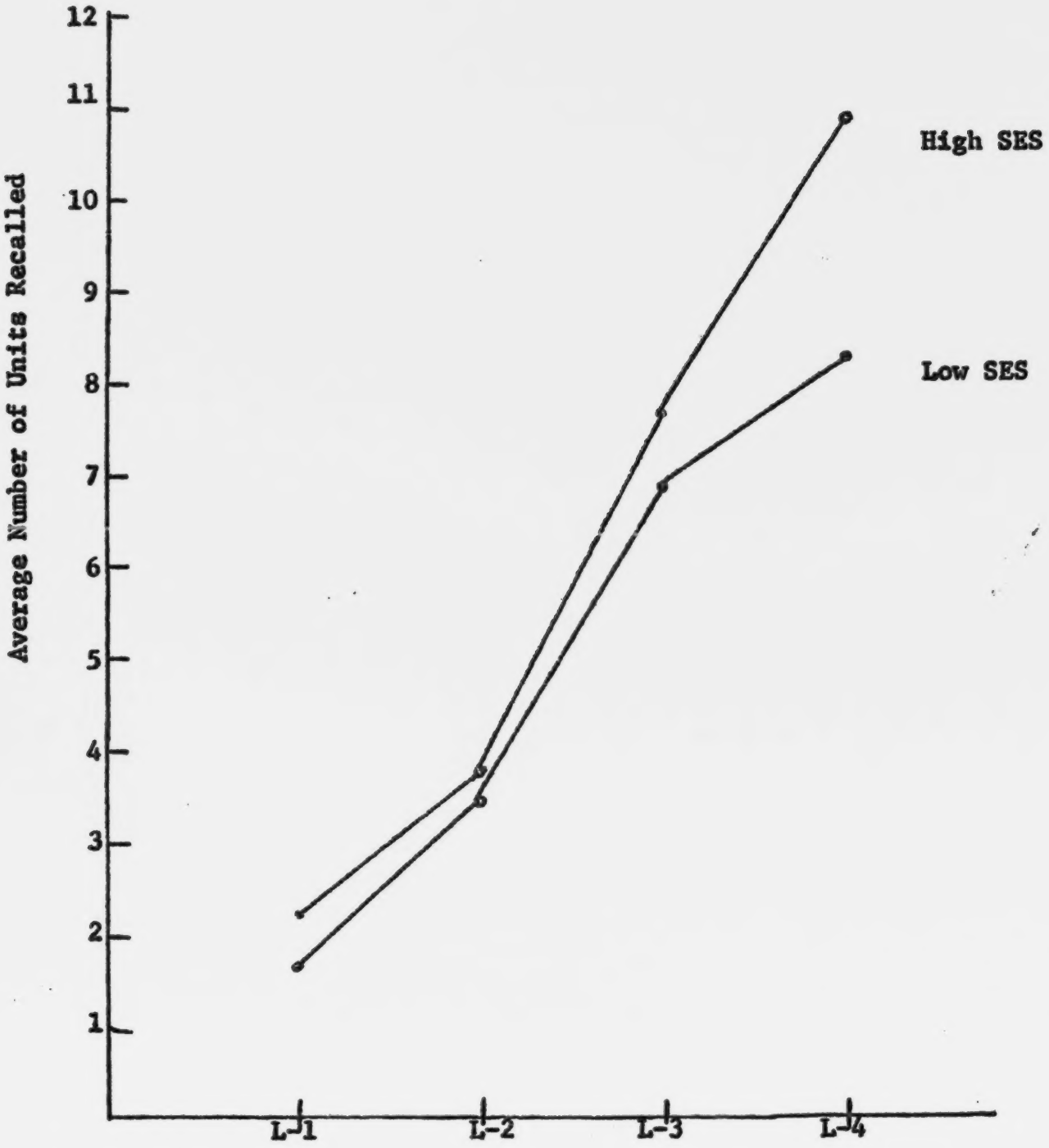
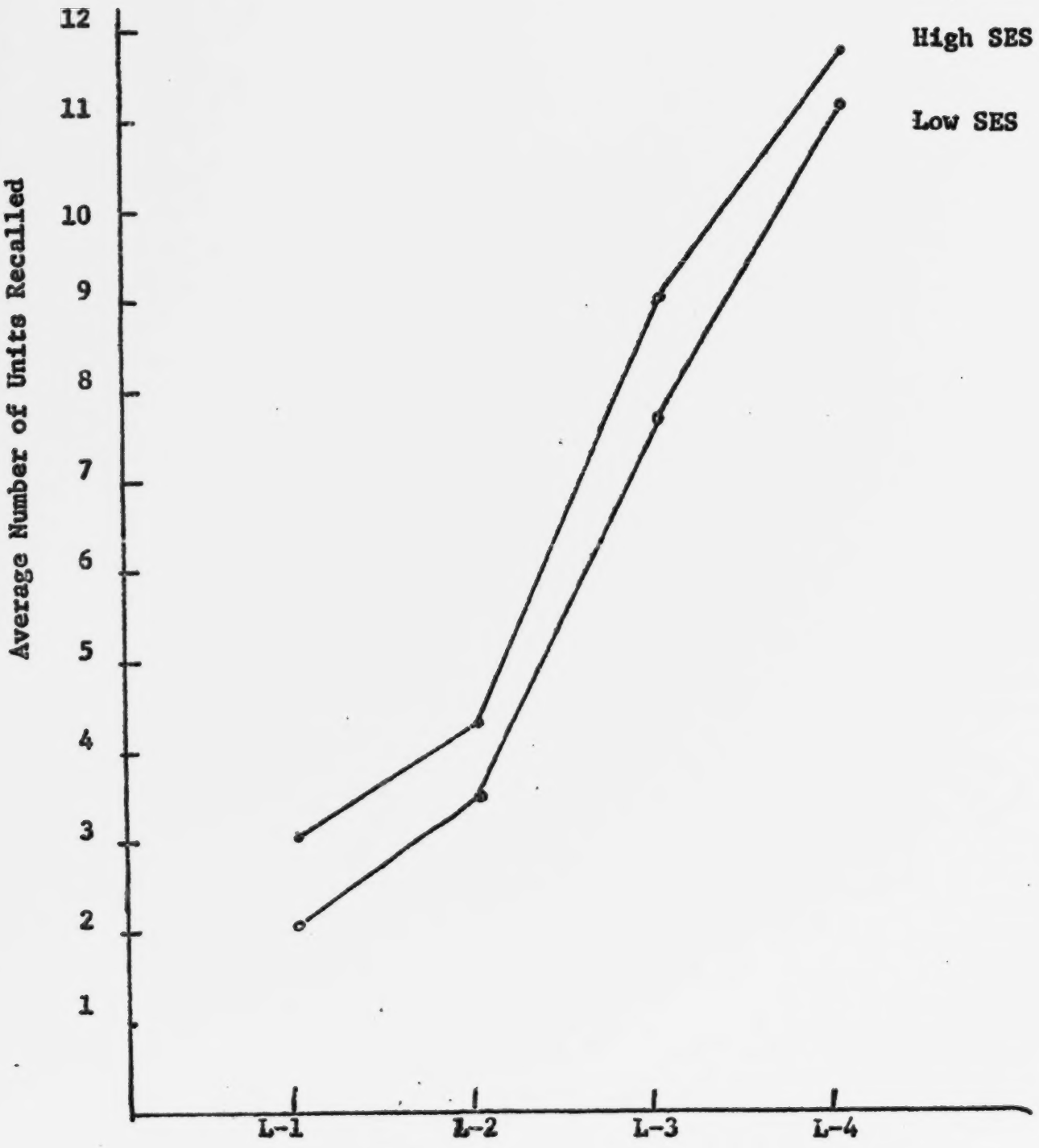


Figure 5

Average Raw Scores for Second Grade Children from High and Low SES groups

	L-1	L-2	L-3	L-4
High SES	3.0588	4.3529	9.0588	11.7647
Low SES	2.0588	3.4706	7.6471	11.1765



APPENDIX

Immediate Memory Test

Level 1

Nonsense Syllables

Item 1:	cax	zab				
Item 2:	dup	mav	tuz			
Item 3:	kuv	rof	fup	nid		
Item 4:	mub	fip	gak	bem	sib	
Item 5:	yod	tud	wib	paf	nus	mef

Pronunciation key: a as in bat, e as in bet, u as in but, o as in go, i as in bit.

Level 2

Item 1:	watch	hill					
Item 2:	gold	church	land				
Item 3:	night	king	men	school			
Item 4:	hand	wind	house	corn	bed		
Item 5:	ball	rain	world	street	year	arm	
Item 6:	wall	mild	word	stone	tree	friend	food
Item 7:	man	air	light	sound	bud	box	death	place

Level 3

Item 1: A truck opened today.

Item 2: Today his man has black fire.

Item 3: The little curly trees ran at a door.

Item 4: A path for new black tails looked down the hand.

Item 5: On the girls she ran over the big friend with some umbrella.

Item 6: The snowman and garden lady, a teacher went in and down as they flew.

Item 7: Old cow and his street slowly jumped up a red kitten to a black, new book.

Level 4

Item 1: The door opened slowly.

Item 2: Today all pigs have curly tails.

Item 3: A little old lady ran down the street.

Item 4: A man on his red truck looked at the fire.

Item 5: Over the trees she flew with a black umbrella in her hand.

Item 6: The snowman and his friend, the cow, jumped up and down as they sang.

Item 7: His kitten and my turtle slowly walked down the garden path to the big, red, barn.

Item 8: The boys and girls went with their teacher to buy some books about pets for their new school.